

WHAT IS CLAIMED IS

1. A method for fabricating a semiconductor device comprising the steps of:

forming over an organic resist film a mask film having etching characteristics different from those of the organic resist film and having an opening formed in a prescribed region; and

etching the organic resist film with the mask film as a mask,

in the step of etching the organic resist film, the organic resist film being etched with a mixed gas of nitrogen gas and oxygen gas.

2. A method for fabricating a semiconductor device comprising the steps of:

forming an insulating film having a first opening in a first region;

forming an organic resist film over the insulating film and in the first opening;

forming a mask film having etching characteristics different from those of the organic resist film over the organic resist film;

forming a second opening in the mask film in a second region including at least a part of the first region; and

etching the organic resist film with the mask film as a mask,

in the step of etching the organic resist film, the organic

resist film being etched with a mixed gas of nitrogen gas and oxygen gas.

3. A method for fabricating the semiconductor device according to claim 1, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is less than 10%.

4. A method for fabricating the semiconductor device according to claim 2, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is less than 10%.

5. A method for fabricating the semiconductor device according to claim 1, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is 1 - 3%.

6. A method for fabricating the semiconductor device according to claim 2, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is 1 - 3%.

7. A method for fabricating the semiconductor device according to claim 1, wherein

a pressure inside a chamber for etching the organic resist film is 25 - 50 mTorr.

8. A method for fabricating the semiconductor device according to claim 2, wherein

a pressure inside a chamber for etching the organic resist film is 25 - 50 mTorr.

9. A method for fabricating the semiconductor device according to claim 1, wherein

the mixed gas further contains fluorocarbon gas.

10. A method for fabricating the semiconductor device according to claim 2, wherein

the mixed gas further contains fluorocarbon gas.

11. A method for fabricating the semiconductor device according to claim 9, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is less than 12%.

12. A method for fabricating the semiconductor device according to claim 10, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is less than 12%.

13. A method for fabricating the semiconductor device according to claim 9, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is not more than 5%.

14. A method for fabricating the semiconductor device according to claim 10, wherein

a flow rate ratio of the oxygen gas to a total flow rate of the mixed gas is not more than 5%.

15. A method for fabricating the semiconductor device according to claim 9, wherein

a flow rate ratio of the fluorocarbon gas to a total flow rate of the mixed gas is 15 - 25%.

16. A method for fabricating the semiconductor device according to claim 10, wherein

a flow rate ratio of the fluorocarbon gas to a total flow rate of the mixed gas is 15 - 25%.

17. A method for fabricating the semiconductor device according to claim 2, wherein

in the step of etching the organic resist film, the organic resist film is etched, left at least on the bottom of the first opening.

18. A method for fabricating the semiconductor device according to claim 2, wherein

in the step of forming the organic resist film, the organic resist film is formed, having the surface made flat.

19. A method for fabricating the semiconductor device according to claim 2, further comprising, after the step of etching the organic resist film, the step of:

etching the insulating film with the organic resist film as a mask.

20. A method for fabricating the semiconductor device according to claim 2, wherein

the insulating film includes one or more films selected from the group consisting of SiO film, SiN film, SiC film and SiOC film.

21. A method for fabricating the semiconductor device according to claim 2, wherein

the first region is a region for via-hole to be formed

in, and

the second region is a region for an interconnection trench to be formed in.